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UNIVERSITY OF ALBERTA

THE EFFECTS OF GOAL SPECIFICITY, GOAL DIFFICULTY AND GOAL SOURCE ON ENDURANCE PERFORMANCE

BY

© ANTHONY STEVEN PEPPER

A thesis submitted to the Faculty

of Graduate Studies and Research

in partial fulfillment of the

requirements for the degree of

MASTER OF ARTS

DEPARTMENT OF PHYSICAL EDUCATION AND SPORT STUDIES
EDMONTON, ALBERTA

SPRING, 1992

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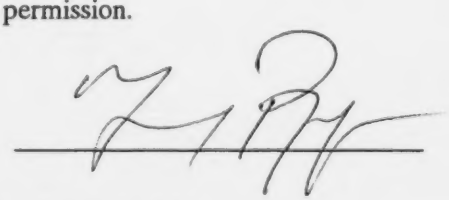
(Signed) 

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FACULTY OF GRADUATE STUDENTS AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled The Effects of Goal Specificity, Goal Difficulty and Goal Source on Endurance Performance submitted by Anthony Pepper in partial fulfillment of the requirements for the degree of Master of Arts in Physical Education and Sport Studies.

Dr. Rikk Alderman

Dr. Barry Mitchelson

Dr. Graham Fishburne

Date: Feb. 20/92

ABSTRACT

The main purpose of the study was to test the relative effectiveness of three different goal setting procedures on the performance of forty-four male university students while attempting to control for the effects of competition and social comparison. The study involved manipulation of three independent variables; goal specificity, goal source, and goal difficulty. The dependent variable in this study was the number of sit-ups on a three minute sit-up task. Subjects were first tested on the endurance task to establish baseline measures and then placed in rank order and randomly assigned from five ability blocks to one of three goal setting conditions: (a) Experimenter-set goal, (b) Subject-set goal, (c) Do-best goal. Subjects were then pre-tested under the same instructions and then posttested after treatment conditions. The results of a one-way analysis of variance on the subjects pre-test scores between the three treatment groups revealed no significant differences, thereby indicating that the random assignment of subjects was effective in producing groups of equal ability. The results of a two-way analysis of variance on the posttest scores between the three treatment groups again revealed no significant main treatment effects and no significant treatment x block interaction effects between low and high ability subjects. Post-hoc questionnaire data, however, was revealing in explaining these results, in particular, the high percentage (66%) of subjects who engaged in personal goal setting and the relative lack of competition, compared to previous research, amongst subjects (i.e., only 16% of subjects competing within their group, and only 11% of subjects competing with subjects in other groups). The results are discussed in terms of the questionnaire responses, previous research, and goal setting theory.

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CHAPTER I

STATEMENT OF THE PROBLEM

Introduction

In sport, coaches and athletes are continually looking for new ways to improve performance, both in training and competition. A proposed technique in sport to enable both coach and athlete to establish and sustain motivation and thereby enhance performance is the technique of goal setting. For instance, it has been suggested that the technique of goal setting will not only sustain the all important factor of motivation (Singer, 1986) but is also linked to positive changes in other psychological states such as anxiety, stress and confidence (Gould, 1986). Goal setting would also appear to have strong intuitive support from those closely involved in sport. Indeed, Swartz and Wayne (1979) have suggested that for marathon runners to consistently run well requires predetermined specific goals. Furthermore, they suggest this process of setting goals helps to modify and correct the athletes mental expectancies, which in turn can help regulate actual performance.

However, there is a paucity of actual sport specific research compared to organizational, industrial, and academic research in the area of goal setting, that has only recently attracted the attention of sport psychologists. Indeed, recent sports specific research has not only begun to question the intuitive support of goal setting in sport but also whether the positive research findings of goal setting found in organizational, industrial, and academic settings, extensively reviewed by Locke, Shaw, Saari, and Latham (1981), are equally applicable to the sporting environment as suggested by Locke and Latham (1985).

This study is an attempt to test the relative effectiveness of three different goal setting techniques on endurance performance in a physical activity setting.

Statement of the Problem

To what extent do different goal setting techniques enhance performance?

Purpose of the Study

The main purpose of this study is to investigate the utility of goal setting as a technique to enhance endurance performance in a physical activity setting. The major question that this study will address is whether increased control over powerful extraneous variables influencing motivation, such as competition and social comparison, will enable goal setting effects to be observed in a physical activity setting. The relative effectiveness of three different goal setting techniques which will involve manipulations of goal specificity, goal source, and goal difficultly will be investigated.

The following specific questions will be addressed:

1. To what extent does goal specificity affect performance
2. To what extent does goal source affect performance
3. To what extent does goal difficulty affect performance

Hypotheses

The following null hypotheses will be tested:

1. Groups utilizing goal setting procedures will not perform significantly

different from each other on the endurance task.

$$\overline{x_1} = \overline{x_2} = \overline{x_3}$$

2. Groups utilizing goal setting procedures will not perform significantly different from the do your best group on the endurance task.

$$\overline{x_1}\ ,\ \overline{x_2} = \overline{x_3}$$

3. Groups utilizing experimenter set goals as opposed to subject set goals will not perform significantly different from each other on the endurance task.

$$\overline{x_1} = \overline{x_2}$$

4. Groups utilizing specific, difficult goals will not perform significantly different from the do your best group on the endurance task.

$$\overline{x_1} = \overline{x_3}$$

Justification of the Study

The major justification of this study is the possibility of demonstrating that goal setting techniques enhance endurance performance in a physical activity setting. In addition to this justification, a number of other factors provide justification for the present study.

Firstly, recent results in the sports literature indicate that the majority of studies failing to find support for goal setting effects on sport performance are field experiments. A confounding variable of such results being within and between group competition amongst subjects. In order to more accurately assess the motivational effects of goals on performance the potential for social comparison and competition needs to be reduced, particularly in field settings.

Secondly, Locke (1991) has outlined the following major methodological flaws of previous research failing to find support for goal setting in sport: (1) manipulation failure of 'do best' condition; (2) failure to measure personal goals, and (3) failure to make specific goals difficult. Therefore, the present study will attempt to control for these shortcomings of past research.

Thirdly, much of the recent sports specific research has used laboratory type experimental designs, bringing into question its relevance to sport.

Fourthly, despite the overwhelming evidence of support for goal setting in industrial, organizational, and academic settings and the strong intuitive support of goal setting within sport, recent sports specific research has produced equivocal results.

Finally, there is a paucity of sports specific research on goal setting in sport.

Delimitations

1. The study was limited to 44 healthy male students attending the University of Alberta in 1991.

2. The study was limited to the following independent and dependent variables:

   Independent variables

   i) goal specificity

   ii) goal source

   iii) goal difficulty

   Dependent variable

   i) a 3 minute timed sit-up

Limitations

1. Although stringent efforts were made, the study had limited control over within and between group communication throughout the testing period, in particular, between testing.

2. The posttest questionnaire has limitations in terms of validity and reliability since it is an exploratory instrument designed to gather additional subjective data to help explain performance.

Operational Definition of Terms

Competition - Trying to get close to, equal, or beat another subjects

performance score.

Difficult Goal - A goal which represents a 20% improvement on the subjects previous performance score.

Experimenter - Set Goal - A goal that is presented to the subject which has been determined entirely by the experimenter.

General 'Do-Best' Goal - A goal stated only orally in which the subject is asked to 'do their best'.

Social Comparison - The process of comparing ones own performance to that of another subject(s).

Specific Goal - A goal which is both explicit and written on paper.

Specific Difficult Goal - A goal which is both 'specific' and 'difficult'.

Subject-Set Goal - A goal which is specified and decided upon entirely by the subject.

Written Exercise Agreement - A written contract both stating a specific goal and a commitment to achieving this goal, which is signed by experimenter and subject.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

There is considerable psychological research available on the topic of goal setting in a variety of laboratory and field settings (Locke et al. 1981). However, very little of the research is specifically sports related. Indeed, it is only relatively recently that research on goal setting in sport has been undertaken. Considering the clear pattern of results that has emerged from the psychological research over the last 20 years it is surprising that sport has taken so long to realize, as a research topic, the full potential of goal setting for performance enhancement. It is in part a reflection of the belated recognition of the importance of applied sport psychology that research on goal setting in sport has received so little attention. Therefore, since it has been suggested that much of the early research in the psychological literature on goal setting can be successfully applied to sport (Locke and Latham, 1985), it will be useful to review both related and sports specific research on goal setting.

A Synopsis of the Literature

Sports specific literature on goal setting has only recently attracted the attention of research sport psychologists. Much of the current discussion has centered on the most appropriate research design to effectively control for within and between group competition amongst subjects. In addition, recent work by Locke (1991) has also highlighted a number of major methodological flaws of goal-setting research in sports,

many of which, Locke argues, have been made repeatedly (e.g., (a) manipulation failure of 'do best' condition, (b) failure to measure personal goals and (c) not making specific goals difficult enough). Thus, despite the intuitive support of goal setting from those closely involved in sport, and the overwhelming evidence of support from the organizational, industrial and academic literature, the results so far regarding the effectiveness of goal setting in sport and exercise psychology have produced equivocal findings, with some studies reporting positive effects (e.g., Barnett and Stanicek, 1979; Botterill, 1977, 1977a; Boyce, 1990; Burton, 1983, 1984, 1989; Hall, Weinberg and Jackson, 1987; Hall and Byrne, 1988; Locke and Bryan, 1966; Tenenbaum, Pinchas, Elbaz and Bar-Eli and Weinberg, 1991; Weinberg, Bruya, Longino, and Jackson, 1988), while others have brought into question these findings (e.g., Barnett, 1977; Garland, Weinberg, Bruya, and Jackson, 1988; Giannini, Weinberg, and Jackson, 1988; Hall, Weinberg, and Jackson, 1983; Hollingsworth, 1975; Miller and McAuley, 1987; Weinberg, Bruya, and Jackson, 1985; Weinberg Bruya, Jackson, and Garland, 1987; Weinberg, Bruya, and Jackson, 1990; Weinberg, Bruya, Garland, and Jackson, 1990a; Weinberg, Fowler, Jackson, Bagnall, and Bruya, 1991; Wraith and Biddle, 1989).

Related Research

Most of the current research on goal setting can be traced back to Locke's (1968) seminal article in which he proposed a model of motivation based upon conscious goals and intentions. As a result of Locke's article a vast amount of research was generated in organizational and academic settings to empirically test the effects of goal setting on task performance. Locke (1968) hypothesized that specific, difficult goals lead to higher levels of task performance than do easy goals, no goals, or do-your-best goals. In a most

comprehensive review of the literature, Locke et al. (1981) reported that 99 of 110 studies surveyed found support for Locke's (1968) hypothesis. The results of Locke et al. (1981) were found in both laboratory and field settings, and led Locke et al. (1981) to conclude that,

> "The beneficial effect of goal setting on task performance is one of the most robust and replicable findings in the psychological literature. Ninety per cent of the studies showed positive or partially positive effects. Furthermore, these effects are found just as reliably in field settings as in the laboratory".
>
> (Locke et al. 1981: p. 145)

Locke et al. (1981) and Locke and Latham (1984) have provided detailed summaries of the research literature on goal setting. The main points of these two reports are as follows:

1. Specific goals direct activity more effectively and reliably than vague or general goals (Locke, Mento, and Katcher, 1978).

2. Difficult or challenging goals produce better performance than moderate or easy goals; the higher the goal, the higher the performance (Locke, 1968).

3. Short-term goals can be used as a means of attaining long-range goals (Bandura and Simon, 1977; Locke, Cartledge, and Knerr, 1970).

4. At least four mechanisms explain why goal setting improves performance. First, goal setting directs the performer's attention and action to important aspects of the task (Locke and Bryan, 1969); second, goal

setting helps the performer mobilize effort (Locke, 1966); third, goal setting not only increases immediate effort but helps prolong effort or increase persistence (LaPorte and Nath, 1976; Latham and Locke, 1975). Finally, through the process of setting goals performers often develop and employ new learning strategies (Latham and Baldes, 1975; Terborg, 1976).

5. Goal setting only works if there is timely feedback showing performance or progress in relation to the goal (Locke et al. 1981).

6. Goals must be accepted in order to be effective (Erez and Zidon, 1984).

7. Goal attainment is facilitated by a plan of action or strategy (Carroll and Tosi, 1973).

8. Competition, a key element in sports, can be viewed as a form of goal setting.

Locke et al.'s (1981) extensive research review and the work of Locke and Latham (1984) would tend to indicate the potential value of goal setting in enhancing performance if applied to the sports setting. Indeed a recent meta-analysis conducted on goal setting effects from 1966 to 1984 supported Locke et al.'s (1981) conclusion concerning the effectiveness of specific hard goals in enhancing performance (Mento, Steel and Karren, 1987).

In an article by Locke and Latham (1985) an attempt was made to apply the earlier results of Locke et al. (1981) and Locke and Latham (1984) to sport. The basis of this application was the premise that success in competitive sports depends largely upon two factors: (a) skill (including strength and stamina) and (b) motivation (eg. mental attitude, confidence). Locke and Latham (1985) believe the technique of goal setting can be used to increase both skill and confidence of athletes in competitive sports and they draw on intuitive support from Dick Hannula, one of the most successful high school swimming coaches in the U.S., who stated:

> "Motivation depends in a very large part on goal setting. The coach must have goals. The team must have goals. Each individual swimmer must have goals--real, vivid, living goals...Goals keep everyone on target. Goals commit me to the work, time, pain and whatever else is part of the price of achieving success. Goals help to drive me...Goals must be high enough to excite you, yet not so high that you cannot vividly imagine them. Goals must be attainable, but just out of reach for now".
>
> (Larsen, 1983 [cited in Locke and Latham, 1985: p. 205])

Having summarized the earlier review of Locke et al. (1981) and Locke and Latham (1984), Locke and Latham (1985) proposed a general hypothesis that goal setting will work as well in sports as in business and laboratory tasks. In addition, based on previous research Locke and Latham (1985) proposed the following ten specific hypotheses:

1. Specific goals will regulate action more precisely than general goals.

2. For quantitative (specific) goals, the higher the goal the better the

performance, assuming sufficient ability and commitment (see hypothesis 7).

3. Specific, difficult goals will lead to better performance than goals of "do your best" or no goals.

4. Using short-term goals plus long-term goals will lead to better performance than using long-term goals alone.

5. Goals will affect performance by directing activity, mobilizing effort, increasing persistence, and motivating the search for appropriate task strategies.

6. Goal setting will be most effective, if not only effective, when there is feedback showing degree of progress in relation to the goal.

7. With goals that are difficult, the higher the degree of commitment the better the performance.

8. Commitment can be affected by asking the individual to accept the goal, showing support, allowing participation in the setting of the goal, training, selection, and incentives and rewards.

9. Goal attainment will be facilitated by a suitable plan of action or strategy,

especially when the task is complex or long-term.

10. Competition will improve performance to the degree that it leads to the setting of higher goals and/or increases in goal commitment.

Sports Specific Research

The results of a number of early sports specific studies have shown mixed support for the use of goal setting in sport. For instance, Barnett (1977) and Hollingsworth (1975) found no goal setting effect with juggling, however the problem of spontaneous goal setting by subjects who were not told to set goals may have confounded the design. In contrast, the results of other early sports specific studies are consistent with the psychological literature in terms of goal setting being positively related to performance enhancement. Locke and Bryan (1966) found that specific, difficult goals led to better performance than 'do your best' goals on a complex coordination task. Barnett and Stanicek (1979) found similar results in an archery experiment. Botterill (1977a) investigated youth ice hockey players performing an exercise endurance task under various combinations of goal difficulty, goal explicitness and goal type (group, subject, or experimenter set) conditions. The dependent variable being performance on a hand dynamometer at 25% of maximum workload, for a specified period of time (maximum of 12 minutes or 720 contractions). The results revealed that goal setting facilitated performance. In addition, difficult goals were more effective in enhancing performance than easy goals, and explicit goals were more effective than general 'do your best' goals. Finally, Botterill (1977a) concluded that explicit difficult, and group set goals were most

effective in enhancing endurance task performance.

In a later study, Burton (1983) examined the effects of a goal setting training program on the performance and cognition (e.g., levels of self confidence, motivation and state anxiety) of male and female intercollegiate swimmers. The results revealed that swimmers who participated in the goal setting training program learned to focus highest priority on performance goals, and those swimmers high in goal setting ability demonstrated better performance and more positive cognitions. In a related study conducted by Burton (1984), with national sports festival swimmers, support was found for Burton's (1983) earlier findings demonstrating that goals were positively related to performance and positive psychological attributes (Gould, 1986).

Locke and Latham (1985) have suggested that an individual's commitment can be affected by allowing participation in the goal setting process. Indeed, it has frequently been found that participation in the goal setting process affects performance only in that it leads to higher goals being set than in experimenter-imposed conditions (Latham, Mitchell and Dossett, 1978; Latham and Saari, 1979; Locke et al. 1981). Participation in the goal setting process has also been thought to have an indirect effect on performance through increasing goal acceptance and providing individuals with feelings of control over their own actions (Erez and Kanfer, 1983). An early study by Schuldt and Bonge (1979) revealed that children performed to a higher level when goals were self-imposed rather than externally-imposed, indicating that choice may make the goal setting process more significant and meaningful to children. Schunk (1985) also found that participation in goal setting for learning-disabled children led to higher perceptions of self-efficacy and better performance on a subtraction task (Wraith and Biddle, 1989). However, much of this research has involved non-sport situations.

In sport, however, a recent study by Wraith and Biddle (1989) which considered the effect of goal participation on task performance has added to the equivocal nature of goal setting research. Wraith and Biddle (1989) note that prior research suggested that children who were allowed to set their own goal, as opposed to having a goal set for them by the experimenter, would perform better. In addition to testing the above hypothesis, Wraith and Biddle (1989) also hypothesized that performance would be enhanced following instructions related to personal effort, as opposed to throwing ability. The results of the study showed that participation in goal setting had no effect on throwing performance, (i.e., the distance the child was able to throw a cricket ball (boys) or rounders ball (girls)) but there was a superior effect on task improvement for ability instructions.

The notion of goal proximity and specificity is an area that has received some attention in recent sports specific goal setting research. It has been suggested that subjects assigned specific difficult goals will perform better than those assigned generalized 'do your best' goals, and using short-term goals plus long-term goals will lead to better performance than using long-term goals alone (Locke and Latham, 1985). However, not all research involving sports activity is supportive of Locke and Latham's (1985) assumption. Indeed, a study by Weinberg et al. (1985) on the effects of goal proximity and goal specificity on endurance performance involving a 3-minute sit-up task, in two separate experiments, led to the following conclusions,

> "The results of the present investigation do not support the literature from the industrial, organizational, and academic areas in that specific hard goals were 'not' significantly better than 'do your best' goals, nor were there significant differences between short and long-term goal conditions".
>
> (Weinberg et al. 1985: p. 304)

However, Weinberg et al. (1985) offer some explanations for their results (e.g., spontaneous goal setting by the 'do your best' group, and that certain subjects may have been highly motivated to improve their fitness prior to the experiment). Furthermore, the authors offer a note of caution particularly with regard to the need for additional research in other sports settings before any results are fully accepted. Weinberg et al. (1985) also stated that if a situation is characterized by a high level of motivation eliciting a high level of effort, and the task itself is one in which fatigue and pain cues are extremely salient, the setting of specific goals may not be necessary. In addition Weinberg et al. (1985) postulate that the nature of the endurance task may also prevent goal setting effects from being observed if subjects encounter performance ceilings. Indeed, as Locke et al. (1981) have stated, goals will only work if they encourage increased effort. As a result of their study, Weinberg et al. (1985) suggest that goal setting theory may require some modification in sport settings.

The reservations expressed by Weinberg et al. (1985) seem to be justified if consideration is given to a similar, more recent study by Hall et al. (1987) who studied the effects of goal specificity, goal difficulty and information feedback on endurance performance. The dependent variable here, being performance on a hand dynamometer endurance task, with subjects being asked to hold a one-third maximum contraction for as long as possible. The results of the study by Hall et al. (1987), in contrast to Weinberg et al. (1985), support the vast body of literature in industrial psychology that specific difficult goals will lead to better performances than generalized 'do your best' goals. However, concern was again expressed by Hall et al. (1987) over their results in that the study, being a laboratory experiment, controlled for a number of variables that may be extremely salient in a natural sports setting and thus influence goal setting and

task performance.

The study undertaken by Weinberg et al. (1985) was again looked at by Weinberg et al. (1988) but this time the emphasis was on the effect of goal proximity and specificity on endurance performance of 'primary-grade children'. The dependent variable being performance on a 2-minute sit up task. Unlike the earlier studies in this area (Weinberg et al. 1985; Hall et al. 1987) the later study by Weinberg et al. (1988) provided mixed support for the effectiveness of goal setting in a physical activity setting. Although Weinberg et al. (1988) note that specific goals appear to enhance performance when compared to 'do your best' goals, no significant differences were found between distal and proximal goal conditions. In the conclusion of their study, Weinberg et al. (1988) point out the complex myriad of variables that must be considered when attempting to apply goal setting strategies in physical activity settings. Furthermore, Weinberg et al. (1988) also suggest that future studies need to investigate if the situation itself (i.e., Laboratory vs Field) is an important variable since a meta-analysis by Tubbs (1986) found that in the industrial and organizational literature, goal setting effect sizes were much greater in the laboratory than in the field, causing some concern about the external validity of these effects. Finally, Weinberg et al. (1988) also suggested that another potential mediating variable might be the nature of the task (Simple vs Complex), since another meta-analysis by Wood, Mento, and Locke (1987) found that goal setting effect sizes were larger for simple tasks than for complex tasks.

> "Researchers need to attempt a better understanding of the underlying mechanisms and situational constraints under which goal setting is most effective if progress is to be made in predicting when goal setting will improve performance in physical activity settings".
>
> (Weinberg et al. 1988: p. 89)

A recent study in the area of goal proximity and goal specificity by Tenenbaum et al. (1991) has again added to the equivocal nature of recent goal setting research in sport by providing some support for the notion that short-term goals used in conjunction with long-term goals can produce significant improvements in performance. Tenenbaum et al. (1991) attempted to extend the literature on the relationship between goal specificity, goal proximity, and performance by using high school students and attempting to control for the effects of social comparison. Two experiments were conducted. In Experiment 1, subjects were randomly assigned to one of five goal-setting conditions: (a) short-term goals, (b) long-term goals, (c) short-plus long-term goals, (d) 'do your best' goals, and (e) no goals. Results indicated that the short-plus long-term group exhibited the greatest increase in performance although the short-term and long-term groups also displayed significant improvements. In Experiment 2, a short-plus long-term group was compared against a 'do your best' group. Results again revealed a significant improvement in performance for the combination-goal group whereas the do-your-best group did not display any improvement.

The notion of goal attainability also featured in Locke and Latham's (1985) recommendations in applying goal setting to sports. Indeed many researchers in the sport psychology literature have recommended strongly to both physical educators and coaches that performance goals should be realistic (Botterill, 1978, 1979, 1980; Gould, 1986; Harris and Harris, 1984; McClements and Botterill, 1979). According to Locke and Latham (1985) performers should be encouraged to strive for goals that are difficult and challenging but yet realistic and attainable. Therefore, unrealistic goals should be avoided since goals that are too difficult will likely result in continuing failure, which in turn will undermine motivation and subsequent performance. To many working in the

field, either as a coach or athlete, this recommendation by Locke and Latham (1985) on goal attainability would appear to have strong intuitive support. However, not all research is supportive of the goal attainability notion as proposed by Locke and Latham (1985). For instance, Garland (1983) has questioned the goal attainability assumption by pointing out that in many laboratory experiments on goal setting positive relationships have been found between goal difficulty and performance, even when very hard goals assigned to subjects have seemingly been beyond their reach. Indeed studies by Locke (1966, 1982) and Weinberg et al. (1987) have not supported the notion that unrealistic goals should be avoided.

In a more recent study, Weinberg et al. (1990a) tested the interactive effects of goal difficulty and positive reinforcement in the form of verbal persuasion on endurance performance. Two experiments were conducted, laboratory (using a hand dynamometer) and field experiment (3 minute sit up). In their conclusions, Weinberg et al. (1990a) suggested that the results from both laboratory and field studies support the notion that unrealistically high goals do not necessarily undermine performance. However, again, one needs to treat these results with caution. Indeed as Weinberg et al. (1990a) note, 'a more heuristic approach' that considers the specific personality characteristics of the individual as well as situational and environmental variables need to be adopted if we are to gain a better understanding of how goals operate in physical activity settings. Weinberg et al. (1990a) also noted that the majority of studies on goal setting have focused on a relatively short time period. There is a need for more longitudinal field studies such as those by Burton (1989) and Stitcher (1989) to provide external validity and generalizability of the relationship between goal setting and athletic performance (Weinberg et al. 1990a).

A most recent study on goal difficulty by Weinberg et al. (1991) has also questioned the goal attainability assumption proposed by Locke and Latham (1985). Weinberg et al. (1991) examined the effects of assigning extremely difficult (i.e., virtually impossible) goals on the performance of a motor skill. In an attempt to add external validity to the findings, two experiments were conducted; one used an endurance task (2-minute sit-up) with children, and the other used a basketball-shooting task with college students, as the dependent variables. The results of both experiments led Weinberg et al. (1991) to state:

> "The most significant finding from the two experiments is a lack of evidence that assigning individuals goals that are unrealistic and way beyond their reach can undermine motivation and performance".
>
> (Weinberg et al. 1991: p. 168)

Hall and Byrne (1988) suggest a possible design flaw in earlier studies (Weinberg et al. 1985) may account for the lack of recent support for the use of goal setting in sport. As Hall and Byrne (1988) point out upon examination of the recent results in the sport literature, the majority of studies failing to find support for goal setting effects on sport performance are field experiments. Alternatively Hall and Byrne (1988) say those demonstrating support were laboratory studies (Botterill, 1977; Hall et al. 1987), well controlled field experiments (Barnett and Stanicek, 1979) or investigations involving lengthy training in effective goal setting (Burton, 1983).

A possible explanation for this problem of conflicting results is put forward by Hall and Byrne (1988) who argue that one of the variables confounding the results of goal setting and sport performance (particularly in field settings) is social comparison (i.e., competition). Hall and Byrne (1988) point out that in the Weinberg et al. (1985) study, 83% of the 'do your best' subjects spontaneously set their own goals. Hall and

Byrne (1988) argue that the setting of goals by the 'do your best' group might be due to how these individuals interpreted the performance situation. In other words, if these subjects perceived that the situation was high in evaluation potential and social comparison, they might have begun to compete with other subjects who were setting goals by setting some goals of their own. This obviously represents a potential design flaw in the Weinberg et al. (1985) study.

Hall and Byrne (1988) suggest that in order to more accurately assess the motivational effects of goals on performance the potential for social comparison and competition needs to be reduced. In addition to determining whether increased control over powerful extraneous variables influencing motivation (i.e., competition) would enable goal setting effects to be observed in sport settings, Hall and Byrne (1988) also examined the utility of either flexible subject set subgoals or rigid experimenter subgoals as adjuncts to long term goals.

The results of the study by Hall and Byrne (1988) seem to confirm the intuitive support goal setting has from coaches and athletes in sport. In addition to demonstrating empirical support of the use of goal setting in sport, Hall and Byrne (1988) also respond to Weinberg et al.'s (1985) claim that modification of goal setting theory is necessary if it is to be applicable to sport, indicating that their (Hall and Byrne) investigation shows that we need to better understand the process of goal setting so that it can be successfully applied as an intervention technique to enhance motivation and performance. They state:

> "clearly, it now behooves investigators to focus on understanding 'how and why' goal setting affects performance rather than designing more empirical investigations to demonstrate that it does".
>
> (Hall and Byrne, 1988: p. 197)

However, Weinberg et al. (1990) have responded to Hall and Byrne's (1988) criticism of their earlier work (Weinberg et al. 1985) by indicating a design flaw in Hall and Byrne's (1988) study. Weinberg et al. (1990) argue that Hall and Byrne (1988) in attempting to control for social comparison (ie. competition) by randomly assigning four separate classes and teachers, each with different goal setting conditions could not account for individual teacher differences. Therefore, Weinberg et al. (1990) argue that in Hall and Byrne's (1988) study any differences between the specific goal setting conditions and the 'do your best' condition might be explained by differences in teaching style, motivation of the teacher, personality of the teacher, and so forth. In addition Weinberg et al. (1990) also note that despite the fact that stringent efforts were made to adequately control for competition between subjects by Hall and Byrne (1988), only limited success was achieved. Specifically, questionnaire results revealed that over 55% of the control group spontaneously set goals and 56% of all subjects indicated that they had engaged in competition at some point during the task.

Weinberg et al. (1990), therefore, set out to replicate Hall and Byrne's attempt to control for competition effects by randomly assigning classes to goal setting conditions but keeping the teacher constant for all groups. Weinberg et al. (1990) suggested that this would allow for a cleaner test of the effects of specific goals on performance while attempting to control for competition (i.e., social comparison) effects.

The results of the study by Weinberg et al. (1990) indicated that all groups significantly improved over the course of the 5 week experimental period. No other comparisons reached significance. Although the study was able to reduce the amount of competition and spontaneous goal-setting that occurred, it certainly did not eliminate it, (32% of the control group was setting goals; 38% of all subjects indicated that they

engaged in competition at some time during the task; and 27% of the subjects in specific goal groups set their own goals in addition to the one provided by the experimenter). Therefore, social comparison and competition were still active among subjects. Weinberg et al. (1990) suggest it is 'thus incumbent upon researchers to become more aware of how extraneous variables such as social comparison operate when testing goal setting effects in physical activity and sport environments' (p. 95). For example, Locke and Latham (1985) have argued that competition will result in the setting of higher goals as well as increasing commitment to goals and this would lead to higher levels of performance. However, researchers in education (Ames, 1984; Nicholls, 1979) and sport psychology (Burton, 1989) have argued from both a theoretical and an empirical perspective that focusing on competitive goals by comparing one's performance to that of others will eventually undermine subsequent performance since the focus is on ego protection, which reduces attention to the task as well as minimizes mastery attempts. Alternatively, Burton (1989) suggests athletes who focus on self-improvement and mastery have goals under their own control, which fosters increased confidence, reduced anxiety, and realistic expectations. Weinberg et al. (1990) further suggest that this should not be construed to mean that competition and social comparison are not important processes, as they relate to the setting of, and striving to reach, goals. Weinberg et al. (1990) state:

> "It is obvious that in real-life sport settings, competition and social comparison are prevalent and goal setting will typically occur under these constraints. Rather, as noted by Hall and Byrne (1988), future research should focus on gaining a better understanding of the process of goal setting in sport and exercise settings including potential mediating variables such as feedback (Saari and Latham, 1982), rewards (Latham, Mitchell, and Dossett, 1978), participation (Locke and Schweiger, 1979), supportiveness

> (Latham and Saari, 1979), and difficulty (Weinberg et al. 1987).
>
> (Weinberg et al. 1990: p. 96)

Thus far then, the results of the effectiveness of goal setting in sport and exercise psychology have produced equivocal findings. Specifically, with some studies supporting the effectiveness of goal setting in enhancing performance, (e.g., Barnett and Stanicek, 1979; Botterill, 1977, 1977a; Boyce, 1990; Burton, 1983, 1984, 1989; Hall et al. 1987; Hall and Byrne, 1988; Locke and Bryan, 1966; Tenenbaum et al. 1991; Weinberg et al. 1988) and conversely, a growing number of studies that have brought into question these findings (e.g., Barnett, 1977; Garland et al. 1988; Giannini et al. 1988; Hall et al. 1983; Hollingsworth, 1975; Miller and McAuley, 1987; Weinberg et al. 1985; Weinberg et al. 1987; Weinberg et al. 1990; Weinberg et al. 1990a; Weinberg et al. 1991; Wraith and Biddle, 1989).

Recent Methodological Considerations

The equivocal nature of the above research findings on goal setting in sport and exercise psychology clearly runs contrary to the overwhelming evidence of support for goal setting in industrial, organizational, and academic settings (Locke and Latham, 1990). Indeed, the efficacy of goal setting in improving task performance is one of the best established findings in management and psychology (Locke, 1991). In view of this, Locke (1991) suggests it is anomalous that several studies on goal setting in sport and exercise psychology have obtained null results, despite the expectation that goal setting should work in these realms just as well as, if not better than, in other realms (Locke and Latham, 1985). However, Locke (1991) suggests that if one reads the studies that obtained null results closely, it is clear that these results are due to methodological flaws,

many of which have been made repeatedly. Locke (1991) has outlined the following three major methodological flaws in goal setting research on sport.

1. Manipulation failure of "do best" condition: one of the most common findings in goal-setting research is that specific, difficult goals lead to better performance than do your best goals. Mento et al. (1987) went so far as to argue that "if there is ever to be a viable candidate from the organizational sciences for elevation to the lofty status of a scientific law of nature, then the relationships between goal difficulty/specificity and task performance are most worthy of serious consideration" (p. 74). Indeed, Locke, Cartledge, and Koeppel, (1968) noted over 20 years ago that when subjects are given feedback about their past performance, they may use it to set specific goals. This means that subjects in the do-best condition, if given feedback, may set specific goals for themselves unless they are specifically prevented from doing so. 'Thus, the first rule of good procedure in goal-setting research is make sure that do-best subjects do not set specific goals' (Locke, 1991: p. 312).

2. Measure personal goals: To a large extent, subjects in laboratory settings work toward the goals assigned to them (Locke and Latham, 1990), but this is by no means always the case. Thus, to know how a subject will perform, it is imperative to know what personal goal each subject sets in response to the goal that was assigned. Goal theory (Locke and Latham, 1990) asserts that assigned goals affect performance through their effects on personal goals. Even knowing that a subject is not committed to an assigned goal is not very helpful unless one knows what goal was substituted for the assigned one (Locke, 1991).

In addition, when specific goals are assigned but subjects reach them easily and then set new, higher goals (e.g., Hall et al. 1987), there is no way to tell what these

subjects' real goals are unless one asks them. Subjects assigned easy goals, in fact, may end up as medium- or even difficult-goal subjects. On the other hand, subjects assigned difficult goals may set moderate or easy goals for themselves. 'Thus, the second rule of good procedure is measure personal goals' (Locke, 1991: p. 313).

3. Make specific goals difficult: Locke and Latham (1990) note that goal setting theory does 'not' claim that specific goals, as such, lead to better performance than do do-best goals. The specific goals must also be difficult. Specific goals that are easy actually lead to lower performance than do do-best goals (Locke and Latham, 1990); moderate goals usually lead to the same level of performance as do do-best goals (Locke, 1991).

Unfortunately, in many goal-setting studies in the field of sport, the specific goals have been moderate rather than difficult (e.g., Hollingsworth, 1975; Hall et al. 1987; Weinberg et al. 1985, Study 1). 'Thus, the third rule of good procedure in goal setting is make sure that specific goals are actually difficult (e.g., so that no more than 10% of the subjects can reach them)' (Locke, 1991: p. 314).

CHAPTER III

METHODS AND PROCEDURE

The Task

The dependent variable used in this study was performance on a standardized exercise endurance task. The subjects were tested on the number of sit-ups they could do in three minutes. Previous research (Weinberg, 1985) has noted that three minutes provides a more realistic endurance task than just one minute of sit-ups. Weinberg (1985) has suggested that the extra time would give subjects an opportunity to be motivated by their goal rather than just doing their sit-ups as fast as possible in a minute, since subjects would often fatigue before three minutes had passed and then rest a little before they did more. Thus, it was assumed motivation and goals were more salient here than just doing sit-ups for one minute.

The task was standardized for subjects in the following ways:

1. A standard starting position was required on each sit-up. The subject was required to lie in a supine position, knees bent at a right angle, and feet shoulder width apart. The hands were placed at the side of the head with fingers over the ears. The elbows were pointed towards the knees. The hands and elbows remained in these positions for the entire duration of the test. Also, each subjects' ankles were held by a research assistant throughout the test to count the number of sit-ups and ensure correct technique.

2. A standard range of motion was required on each sit-up. The subject, on command of the experimenter, was required to sit-up, bringing the elbows up to the knees and return to the starting position (shoulders touching the floor).

3. Feedback was standardized. Subjects were given no reinforcement or encouragement during the testing period. No indication of time was given to the subject, except when to start and when to finish. Also, research assistants were told not to count out loud and not to reveal the number of sit-ups to any of the subjects.

4. Time was standardized. All subjects were timed, (using a hand held stopwatch) for exactly three minutes on the sit-up task.

5. Rest periods were standardized. Any subject who needed to rest before the end of the three minutes, remained in the starting position.

Subjects

The subjects involved in this investigation were randomly selected from an experimentally accessible population of male students attending the University of Alberta in 1991. Forty-seven volunteer subjects agreed to participate in the study. However, two subjects withdrew from the study before it started and the data of another subject (Treatment A) was contaminated, (the subject failed to sign his written exercise agreement) so he was eliminated from the final analysis. This resulted in 14 subjects in Treatment A, 15 in Treatment B, and 15 in Treatment C. All subjects signed a consent

form acknowledging the risks and benefits of the study and that they were able to withdraw from the study at any time. All subjects were tested in a gymnasium at the University of Alberta. Subjects of one gender were chosen to control for gender differences effects.

Experimental Design

In order to test the effects of the goal setting procedures on performance a pre-test, posttest group design was used: specifically,

Random Assignment - Pre-test - Treatment A - Posttest

Random Assignment - Pre-test - Treatment B - Posttest

Random Assignment - Pre-test - Treatment C - Posttest

The only modification to the above design was that, prior to random assignment taking place, all subjects were individually tested on the three minute sit-up task to establish baseline measures. Subjects were then placed in rank order and randomly assigned from five ability blocks of nine subjects to one of the three experimental groups. This design procedure not only increased the possibility of equal groups (Borg and Gall, 1989) but also allowed the experimenter to determine any interaction effects that might exist between high and low ability subjects (Glass and Hopkins, 1984).

Procedure

All subjects were individually tested on the three minute sit-up task to establish baseline measures. The correct sit-up technique was first explained and then

demonstrated by the experimenter. The subject was then provided with the opportunity to practice until he felt comfortable with the required technique. The subject was then tested for baseline measures on the sit-up task. The instruction given to the subject immediately prior to the baseline assessment was, "How many sit-ups can you do in three minutes?" The experimenter then told the subject to "start" and timed for three minutes. At the end of the three minutes the experimenter told the subject to "stop" and his score was recorded privately by the experimenter. This procedure was repeated for all subjects.

Having established baseline measures, subjects were then, based on sit-up scores, placed in rank order, and divided into five ability blocks. The top nine subjects were then randomly assigned to one of three experimental conditions. This procedure was then repeated with each block of nine subjects until all subjects had been assigned to an experimental group. Such pre-randomization blocking is an advisable technique for overcoming problems concerning high variability associated with field research (Cook and Campbell, 1979).

Following random assignment to treatment groups all subjects were then pre-tested on the three minute sit-up task. Each subject, upon entering the gymnasium, was assigned a research assistant to assist in holding the subjects ankles and for counting their sit-ups. Subjects within each group were seated away from each other and placed in a large circular position on the gymnasium floor to avoid any direct observation of other subjects on either side. Each of the treatment groups were individually and privately tested. The instruction given by the experimenter to all subjects immediately prior to the pre-test was, "How many sit-ups can you do in three minutes?" The experimenter then told the subjects to "start" and timed for three minutes. At the end of

the three minutes, the experimenter told the subjects to "stop" and remain in the starting position until all scores had been collected from the research assistants by the experimenter. Subjects were then asked to leave the gymnasium. This procedure was then repeated for the other two treatment groups.

Following the pre-test, all subjects were then retested under treatment conditions on the posttest. Having been exposed to one of three treatment conditions the procedure for conducting the posttest was identical to that of the pre-test, except that, upon leaving the gymnasium the subjects were shown to a private room by a research assistant to complete a questionnaire (See Appendix D)[1]. The questionnaire was used as an exploratory instrument designed to gather subjective data that might be helpful in explaining the results.

Since a number of subjects from each group were not available to be tested in their group, one unexpected modification to the above procedure was that these subjects had to be tested individually (See Appendix C). In such cases, the experimenter ensured that these subjects were tested under the appropriate experimental condition.

In total, each subject was tested three times (Baseline, Pre-test and Posttest). In order to minimize fatigue effects all baseline scores were collected over a period of one week. The pre-test and posttest scores were collected the following week on two separate days. All the data was collected over a two week experimental period.

The Treatments

The three treatment conditions involved manipulations of the following three

---

[1] The format and data analysis of the post-hoc questionnaire was adapted from Botterill (1977a). The questions, however, were changed to meet the specific needs of the present study.

independent variables, goal specificity, goal source, and goal difficulty. The treatment conditions can be summarized as follows:

	Treatment Conditions		
	A	B	C
Goal Specificity	Specific	Specific	General
Goal Source	Experimenter	Subject	Experimenter
Goal difficulty	Set by Experimenter	Set by Subject	--

Treatment A

1. Each subject was comfortably seated on the floor of the gymnasium for the purpose of communicating a specific, difficult experimenter-set goal.

2. Each subject was then individually informed about his performance on the pre-test (i.e., the number of sit-ups he had managed to complete) and handed a written exercise agreement (see Appendix B). All subjects in Treatment A were asked to keep these scores private.

3. It was then explained to the subject that their posttest goal, which they were to strive for on the retest, was to be set for them by the experimenter. Based on previous work in this area (i.e., Hollingsworth, 1975; Hall et al. 1987; Locke, 1991; Weinberg et al. 1985) an increase of 20% on the subjects pre-test score was considered a sufficiently difficult enough goal for the present study. This improvement goal had already been calculated by the experimenter and appeared on the subjects written exercise agreement.

4. Subjects were then, prior to being retested, asked to read and sign the exercise agreement indicating that they had understood the instructions. All subjects agreed to sign.

5. The subjects were then retested.

Treatment B

1. Each subject was comfortably seated on the floor of the gymnasium for the purpose of communicating a specific, subject-set goal.

2. Each subject was then individually informed about his performance on the pre-test (i.e. the number of sit-ups he had managed to complete) and handed a written exercise agreement. All subjects in Treatment B were asked to keep these scores private.

3. It was then explained to the subject that their posttest goal, which they were to strive for on the retest, was to be set by themselves. The subject was asked to think about the task and decide upon a goal. No help was given to the subject only to remind them that the posttest goal was to be entirely their own decision. Having decided upon a goal the subject was then asked to write down the specific number of sit-ups in the appropriate space on the written exercise agreement.

4. Subjects were then, prior to being retested, asked to read and sign the exercise agreement indicating that they had understood the instructions. All subjects decided upon a goal and agreed to sign.

5. The subjects were then retested.

Treatment C

1. Each subject was comfortably seated on the floor of the gymnasium for the purpose of communicating a general experimenter-set 'do your best' goal.

2. Each subject was not individually informed about his performance on the pre-test (i.e. the number of sit-ups he had managed to complete). Previous work in this area (Locke, Cartledge, and Koeppel, 1968; Lock, 1991) noted that when subjects are given feedback about their past performance they may use it to set specific goals.

3. It was then explained to the subject, by the experimenter, that they were to 'do the best they can' on the posttest.

4. Subjects were not, prior to being retested, required to sign a written exercise agreement, since their goal was a, general 'do-best' goal.

5. The subjects were then retested.

In order to avoid any possible 'ceiling effects' subjects in both Treatment A and Treatment B were instructed to continue on the endurance task until the end of the three minutes even if their individual goal had been reached before the three minutes had elapsed.

Data Analysis

The main objective in analyzing the data was to assess and interpret any performance differences between groups. Thus, the following methods of analysis were performed.

1. Mean scores and standard deviations for each group on the baseline, pre-test and posttest were computed and mean performance increases per group between pre-test and posttest scores were also computed.

2. Since random assignment does not ensure equal means a One-Way ANOVA with F ratios (α = .05) was computed to determine if significant differences existed on the pre-test scores between the three experimental groups, specifically:

    - between Group 1 and Group 2
    - between Group 1 and Group 3
    - between Group 2 and Group 3

3. A Two-Way ANOVA and F ratios (α = .05) was computed to determine if any

significant main effects existed on the posttest scores between the three experimental groups and to determine if any significant interaction effects existed between high and low ability subjects, specifically:

- between Group 1 and Group 2
- between Group 1 and Group 3
- between Group 2 and Group 3

4. The 15 cell means on both the pre-test and posttest were calculated to provide a graphical illustration of performance across abilities and groups.

5. Pearson Product Moment Correlations were computed between the different questionnaire item responses and posttest performance on the endurance task to determine any relationship.

6. Pearson Product Moment Correlations were computed between the responses to the different questionnaire items to determine any relationship.

7. Questionnaire Response Frequency Tables were calculated. From these tables percentage breakdown of questionnaire item responses were calculated to provide descriptive information about the total sample (see Appendix E).

CHAPTER IV

RESULTS AND DISCUSSION

Results

There was a wide range and large variance in the sit-up scores between high and low ability subjects on baseline, pre-test and posttest performance across all treatment groups (see Appendix C). The results of the mean number of sit-ups by treatment groups between pre-test and posttest performance revealed that all groups improved, with Treatment Group A showing the most improvement (see Table 1). However, not all subjects improved on their posttest performance compared to their pre-test performance (see Appendix C).

Table 1

Mean Number of Sit-ups by Treatment Groups

TREATMENT GROUP	BASELINE		PRE-TEST		POSTTEST		MEAN INCREASE BETWEEN PRE & POSTTEST
	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	
A	78.6	23.2	84.6	26.1	87.5	26.7	2.9
B	81.0	21.8	86.8	25.2	87.6	26.9	0.8
C	80.3	20.2	86.5	22.0	88.5	24.0	2.0

S.D. = Standard Deviation

A one-way analysis of variance (ANOVA) on the pre-test scores between the three treatment groups revealed no significant differences at the point 0.05 level, thereby, suggesting that the random assignment of subjects was effective in producing equal

groups (see Table 2).

Table 2

One-Way ANOVA (Pre-test)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F-RATIO	PROBABILITY
BETWEEN GROUPS	38.6524	2	19.3262	.0323	.9683
WITHIN GROUPS	24539.3476	41	598.5207		
TOTAL	24578.0000	43			

A two-way analysis of variance (ANOVA) on the posttest scores between the three treatment groups revealed no significant main treatment effect and no significant treatment x block interaction effect at the point 0.05 level. The block effect was significant as can be expected between low and high ability subjects (see Table 3).

Table 3

Two-Way ANOVA (Posttest)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F-RATIO	PROBABILITY
TREATMENT	42.79	2	21.40	0.09	0.91362
BLOCK	19729.89	4	4932.47	20.89*	0.00000
TREATMENT X BLOCK	1189.56	8	148.70	0.63	0.74608
ERROR	6847.17	29	236.11		

*Significant $P < .01$

In order to compare pre-test and posttest performances between subjects abilities across the three treatment groups, cell means were calculated (see Table 4 and Table 5). These pre-test and posttest cell means were then plotted for comparison (see Figure 1 and Figure 2).

Table 4

Pre-test Cell Means

	TREATMENT GROUP		
	A	B	C
Block 1	127.5	111.7	111.0
Block 2	99.3	102.7	105.7
Block 3	90.0	92.0	77.0
Block 4	67.7	72.0	81.0
Block 5	53.0	55.7	57.7

Table 5

Posttest Cell Means

	TREATMENT GROUP		
	A	B	C
Block 1	125.5	106.0	114.0
Block 2	97.3	107.0	102.0
Block 3	93.7	97.0	84.7
Block 4	86.3	75.0	87.3
Block 5	47.3	53.0	54.7

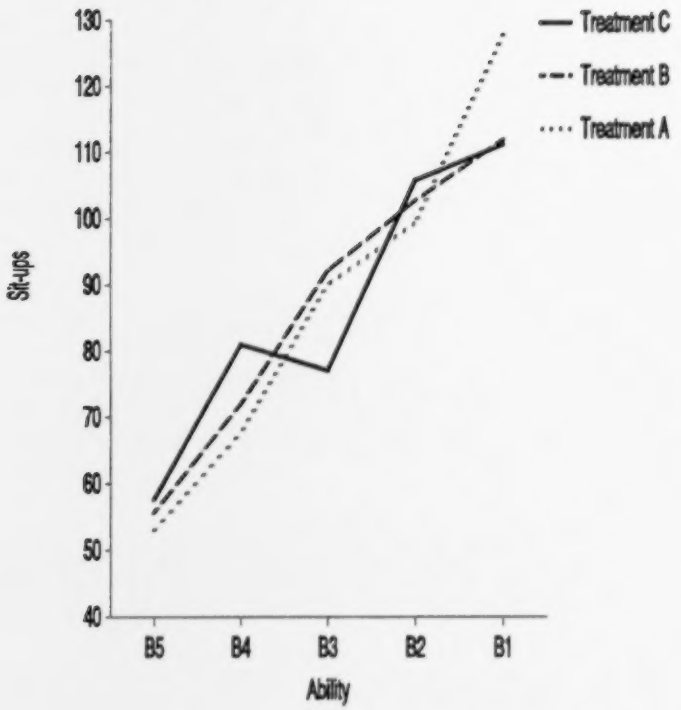

Figure 1. Performance across ability between treatment groups on the Pre-test.

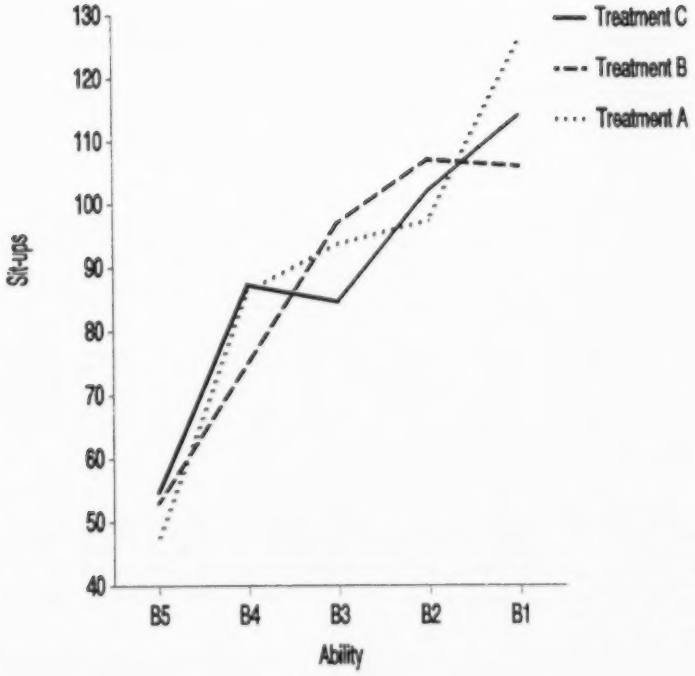

Figure 2. Performance across ability between treatment groups on the Posttest.

Post-hoc questionnaire data was also collected to help explain any performance differences which might exist between the three treatment groups.

In an attempt to identify questionnaire responses which might be related to performance on the endurance task Pearson Product moment correlations were calculated (see Table 6). Since questionnaire responses, from question 2 through to question 10, form a type of continuum they were coded on a scale of 1 to 4 and correlated with performance on the endurance task over all subjects.

Table 6

Correlations Between Questionnaire Responses and Performance on the Endurance Task

QUESTION	CORRELATION	PROBABILITY
2	-.10	.28
3	-.13	.20
4	.12	.22
5	-.26*	.04
6	.20	.10
7	-.25	.05
8	.02	.44
9	-.03	.42
10	-.12	.23

* $P < .05$

In general, these correlations were low. The only correlation with a probability $< .05$ was question 5. This negative correlation of question 5 with performance suggests that subjects who performed best were those who tended to find the endurance task most enjoyable (i.e. least painful).

Correlations were also calculated between the responses to different questionnaire items. Since a number of questions correlated at the .05 level only

correlations with a probability < .01 are listed in Table 7.

Table 7

Correlations Between Questionnaire Item Responses

QUESTION #'s	CORRELATION	PROBABILITY
4 and 7	-.57	.00
6 and 8	.50	.00
2 and 3	.48	.00
4 and 9	-.43	.00
7 and 9	.39	.00

P < .01

The correlations between questionnaire item responses suggest the following possible relationships; question 4 and question 7 between 'setting personal goals' and 'performance being important'; question 6 and question 8 between 'the experimenters limited motivational influence' and 'the subjects limited importance to please'; question 2 and question 3 between 'not competing within a group' and 'not competing with other groups'; question 4 and question 9 between 'setting personal goals' and 'being motivated for the posttest'; question 7 and question 9 between 'feeling some importance to doing well' and 'being motivated for the posttest'.

The questionnaire responses from treatment group C to question 11 revealed that only one subject noticed the change in instructions from, how many sit-ups can you do in three minutes?" (on the pre-test), to 'do as best you can' (on the posttest).

The questionnaire data also provided descriptive information concerning the total sample. The responses to an open ended question asking subjects why they volunteered

for the study (question 1) revealed that 68% did so simply to help out, 18% were interested in testing and research, 11% were interested in personal fitness, and 2% reported 'competing against others'. Questionnaire item #2 revealed that 84% of subjects did not compete with subjects in their own group. Similarly, questionnaire item #3 revealed that 89% of subjects did not compete with subjects in other groups. Questionnaire item #4 revealed that 66% of subjects were setting their own personal goals. Questionnaire item #5 revealed that 61% of subjects found the latter stages of the sit-up task uncomfortable, with only 23% reporting a painful response. Questionnaire item #6 revealed that 73% of subjects reported the researcher as having no effect on their motivation. Questionnaire item #7 revealed that 50% of subjects felt it only a little important to do well on the sit-up task. Questionnaire item #8 revealed that 41% of subjects felt it not important to please the researcher with 34% feeling only a little importance. Questionnaire #9 revealed that 41% of subjects were quite motivated to do well immediately before the posttest, with only 14% reporting that they were not motivated at all. Finally, responses to questionnaire item #10 revealed that overall 59% of subjects felt they worked fairly hard with 39% feeling they worked very hard.

Discussion

The results of the present study provide limited support for the effectiveness of any one of the three different goal setting conditions in a physical activity setting. Although Treatment Group A showed the greatest mean increase from pre-test to posttest performance, the two-way analysis of variance revealed that no group showed any significant differences on the posttest performance. Thus, the present study provides

no justification for the rejection of either Hypothesis One (that groups utilizing goal setting procedures will not perform significantly different from each other on the endurance task), Hypothesis Two (that groups utilizing goal setting procedures will not perform significantly different from the do your best group on the endurance task), Hypothesis Three (that groups utilizing experimenter set goals as opposed to subject set goals will not perform significantly different from each other on the endurance task) or, Hypothesis Four (that groups utilizing specific, difficult goals will not perform significantly different from the do your best group on the endurance task).

However, in response to such findings a number of observations need to be discussed. The early observation concerning the difference between subjects pre-test and posttest scores may suggest that some subjects were simply not motivated by their posttest goal particularly since some subjects on their posttest performance failed to improve on their pre-test score. For instance, five subjects from each of the three treatment groups had a lower posttest score compared to their pre-test score. The alternative explanation may be insufficient recovery time thereby indicating that fatigue could have been for some subjects an important factor contributing to their posttest performance. However, since approximately two-thirds of subjects in each of the three treatment groups either equalled or improved upon their pre-test performance on the posttest, it is also necessary to consider some other possible explanations.

Since Treatment Group A and Treatment Group B had specific goals to aim for on the posttest it would seem important to consider these results in more detail. In addition, it would also seem necessary to consider in more detail the relatively good performance of Treatment Group C compared to Treatment Group A and Treatment Group B.

The posttest goal for Treatment Group A represented a 20% improvement on their pre-test score and although nine subjects improved on their posttest score compared to their pre-test only four subjects managed to equal or better their posttest goal. This may initially indicate that the posttest goal for Treatment Group A was difficult. However, it should also be noted that Locke (1991) has suggested that goal setting theory does 'not' claim that specific goals, as such, lead to better performance than do-best goals. These specific goals must also be difficult (e.g., so no more than 10% of subjects can reach them). Thus, since 29% of subjects in Treatment Group A managed to attain or improve upon their posttest goal this may indicate that the goal was not difficult enough. Indeed, although a number of researchers have suggested that goals should be realistic (i.e., Botteril, 1978, 1979, 1980; Gould, 1986; Harris and Harris, 1984; McClements and Botteril, 1979), an increasing number of others have questioned the goal attainability assumption that unrealistic goals should be avoided (i.e., Garland, 1983; Locke, 1966, 1982; Weinberg et al. 1987, 1990a, 1991). Thus, although subjects in Treatment Group A were told to continue on the endurance task even if their posttest goal had been reached, the setting of a 20% improvement goal may have resulted in, for some subjects in Treatment Group A, a number of 'performance ceilings' as subjects perhaps began to realize they had reached their goal and started to slow down or stop.

An additional confounding factor that may also help to explain Treatment Group A's relatively poor performance is 'personal goal setting' by subjects. For instance, of the 43% of subjects in Treatment Group A who were setting their own personal goal on the posttest (Questionnaire item #4), 29%[2] of these subjects set a lower personal goal than

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[2] The remaining 14% of personal goal setting in Treatment Group A was split evenly between setting a 'higher' personal goal and setting the 'same' personal goal in relation to the 'experimenter-set goal'.

the goal given to them by the experimenter (i.e. 20% improvement on their pre-test score). This may indicate that these subjects, even though they signed the written exercise agreement, did not fully accept their 'experimenter-set goal'. Such personal goal setting could, therefore have limited Treatment Group A's performance compared to Treatment Group B and Treatment Group C.

The posttest goal for Treatment Group B was decided upon entirely by the subject and it is interesting to note the similarity of the majority of those goals set in Treatment Group B. For instance, only three subjects set a lower goal than their pre-test score and of these three only one subject set a considerably lower goal, the other two subject's goals were within five sit-ups of their pre-test score. All other subject's set a higher posttest goal and again all but one of these subjects kept this improvement within seven sit-ups of their pre-test score. In addition, of those subjects who set the same or higher posttest goal than their pre-test score, seven managed to equal or better this posttest goal. Such participation in the goal setting process has been thought to have an indirect effect on performance through increasing goal acceptance and providing individuals with feelings of control over their own actions (Erez and Kanfer, 1983). Locke and Latham (1985) have also suggested that an individuals' commitment can be affected by allowing participation in the goal setting process. However, although seven subjects in Treatment Group B, compared to four subjects in Treatment Group A, equalled or improved upon their posttest goal, 'conservative goal setting' by subjects in Treatment Group B may have again resulted in a number of 'performance ceilings' thus limiting Treatment Group B's overall performance compared to both Treatment Group A and Treatment Group C.

The unexpectedly good performance of Treatment Group C can in part be

explained by the responses to questionnaire item #4. Locke (1991) has noted the importance of measuring personal goals in any goal setting research. Subjects in Treatment Group C were asked to do as best they could on the posttest and the fact that 67% of these subjects were setting their own personal goals on the posttest may explain Treatment Group C's relatively good performance compared to both Treatment Group A and Treatment Group B. Since feedback was not given to Treatment Group C regarding their pre-test performance it is not possible to determine if those subjects setting posttest goals were setting goals higher or lower than their pre-test performance, unless the subject had made a conscious effort to count the number of sit-ups he did on the pre-test. The responses to questionnaire item #4 do, however, show that of the subjects setting personal goals in Treatment Group C only one subject set a posttest goal clearly below his pre-test performance. Such goal setting may therefore have contributed to Treatment Group C's relatively good overall performance. In addition, questionnaire item #4 also revealed that 43% of subjects in Treatment Group A and 73% of subjects in Treatment Group B[3] were setting personal goals on the posttest. Thus, since 61% of all subjects, in addition to what the experimenter asked of them, were setting their own personal goal on the posttest, the potential motivational influence of the three treatment conditions becomes somewhat obscured.

A major objective of the present study was to control for within and between group competition, which has been a confounding variable in a number of studies failing to find support for goal setting effects on performance (Hall and Byrne, 1988). An

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[3] Of this 73%, 33% indicated setting a higher personal goal than the one written on the exercise agreement and 40% indicated the same personal goal as the one on the exercise agreement. This high latter response may indicate that subjects in Treatment Group B did not interpret Questionnaire item #4 correctly. This confusion was perhaps due to these subjects not taking notice of the opening words of question 4 (i.e., 'In addition to').

encouraging finding from the present questionnaire responses, therefore, was the lack of competition, compared to previous research, (Hall and Byrne, 1988; Weinberg et al. 1990) amongst subjects; with only 16% of subjects competing within their group (question 2) and only 11% of subjects competing with subjects in other groups (question 3). It would seem from the present study that the procedure of assigning research assistants to subjects to hold their ankles, as opposed to subjects working in pairs[4], is a more effective way of reducing competition amongst subjects. Although it should also be noted that since a number of subjects had to be tested individually on the pre-test and/or posttest, these figures may be somewhat conservative since the opportunity to compete directly with other subjects was reduced.

The results from questionnaire items 6 and 8 may indicate some of the potential problems of conducting motivational research using 'healthy' adult students as subjects. Adult subjects are more likely to be aware of and sensitive to experimental procedures, unlike subjects of a younger age who are relatively naive to testing procedures. For instance, the results from question 6 revealed that 73% of subjects indicated that the researcher had 'no effect' on their motivation perhaps indicating the subjects awareness of or even reluctance to having their performance influenced in any way. Similarly the responses to question 8 revealed that 75% of subjects felt it either 'not important at all' or 'only a little important' to please the researcher. This may indicate that these subjects were fairly self-motivated and independent of any external motivational factors, such as the experimenter. Such a response could also indicate that these subjects did not fully accept their posttest goal. Clearly, whenever one is attempting to observe genuine

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[4] A common procedure of many recent goal setting studies using a timed sit-up task as the dependent variable has been to place subjects in pairs, each partner taking in turns to hold each others ankles and count each others sit-ups.

motivational influences on healthy adult subjects problems concerning the subjects sensitivity to experimental procedures must always be taken into consideration.

Another possible confounding factor of the present study could have been social comparison. Indeed, although the responses to question 2 and question 3 were encouraging, with regards to the relative lack of competition amongst subjects, many may well have been aware that their performance was going to be compared to other subjects either within their group or between subjects in other groups. Therefore, if subjects perceived that the situation was high in evaluation potential and social comparison, this factor alone may have been enough of a motivational influence on subjects' performances, irrespective of the goal assigned. This contention is supported by the experimenters own informal discussions with subjects following all the data collection. Indeed, many subjects not only seemed aware that their performance was going to be compared to other subjects (indicating that this had influenced their final performance) but also many subjects expressed a keen interest in other subjects performance[5]. In particular, a common interest was shown by a large number of subjects as to the mean number of sit-ups achieved in three minutes and 'their' score in relation to this 'average' score.

Hall and Byrne (1988) note if subjects are highly motivated to perform on a sporting task, then the use of a motivational tool such as goal setting may not bring about observable effects. Moreover, Weinberg et al. (1985) suggest that if a situation is characterized by a high level of motivation eliciting a high level of effort, and the task itself is one in which fatigue and pain cues are extremely salient, the setting of specific

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[5] Obviously all the subjects individual data was strictly confidential, although subjects were informed, upon request, of an approximate overall mean number of sit-ups achieved in three minutes, at the termination of the experiment.

goals may not be necessary. Similarly, Tenenbaum et al. (1991) have further suggested that endurance tasks, such as the three minute sit-up, provide immediate, salient physiological feedback concerning an individual's level of performance, effort, and fatigue. Consequently, this provides subjects with information concerning their degree of effort at the task so that specific goals may not be as informational as in tasks requiring more precision and fine motor coordination. When set against such a background (e.g., Hall and Byrne, 1988; Tenenbaum et al. 1991; Weinberg et al. 1985) the questionnaire responses to item 5 and item 9 are of particular interest, since question 5 revealed that 84% of subjects found the latter stages of the sit up task either uncomfortable or painful, and question 9 which revealed that 57% of subjects were either quite motivated or very motivated to do well immediately before the posttest. Thus, since the responses to both these questions were spread relatively evenly between the three treatment groups this may also help to explain the non-significant findings of the present study.

Finally, since a number of subjects were not available for group testing and had to be tested individually, this may have influenced the subjects motivation and performance. Although, since the same number of subjects in each group were tested individually on the pre-test and posttest this factor may not have been that influential.

In summary, this study provides limited support for the effectiveness of any one of the three goal setting procedures used. However, these results need to be considered in relation to both the present discussion and other recent research findings.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The findings of the present study, although offering no significant support for the effectiveness of any one of the three goal setting procedures used, do however provide some useful information concerning the nature of the situation itself. The extent to which personal goals were being set clearly confounds the potential effectiveness of any one of the goal setting procedures. Such personal goal setting does not allow for an adequate test of Locke's (1968) theory that specific, difficult goals lead to higher levels of task performance than do easy goals, no goals or do-your-best goals, as it conceals the true effect of goal setting on sport performance (Hall and Byrne, 1988). It would seem from the present study that many subjects approached the endurance task with a predetermined goal or standard they personally wished to reach (Questionnaire item #4). When this is combined with the possible knowledge that their performance is going to be compared to others, the setting of any additional 'external goals' may either not be necessary or assume a less important role than the subjects. When subjects were given the opportunity to set their own goal, conservative goal setting appears to have resulted in a number of performance ceilings.

Goal setting as a technique clearly helps subjects to regulate performance, as many subjects consciously chose to do by setting their own personal goal. However, the specific testing of goal setting effects in a physical activity setting still remains a methodological problem due to the complex myriad of variables influencing motivation

and final performance (Weinberg et al. 1988). Thus, since much of the recent research on goal setting in sport and exercise psychology has produced equivocal findings it would seem that the challenge of future research is to effectively control for confounding variables, and empirically demonstrate under what conditions goal setting is most effective in order to fully substantiate the strong intuitive support that goal setting has in sport.

Recommendations

1. Since the present study was conducted over a relatively short time period, future research should consider more longitudinal field studies to add external validity and generalizability to the relationship between goal setting and athletic performance.

2. Since the present study considered a relatively small treatment sample of one gender, future research should consider a larger treatment sample involving both males and females.

3. Since much of the recent research on goal setting in a physical activity setting has utilized tasks that involve strength or endurance, causing a number of researchers to suggest that specific goal setting may not be necessary when fatigue and pain cues are salient, future research might consider tasks which involve skill and fine motor coordination.

4. The present study, in support of Locke's (1991) recommendation, demonstrates

the clear need of future research to measure the extent to which personal goals are being set by the subjects.

5. Future research needs to further investigate the effect of goal difficulty on performance and determine the extent to which unrealistic goals affect different types of individuals under a variety of situations.

6. Future research also needs to consider the extent to which participation in the goal setting process not only affects goal acceptance and commitment but also the subsequent level of goal difficulty set.

7. Careful consideration should always be given to the effects of competition and social comparison, when attempting to compare the motivational influence of goal setting procedures.

8. Future research on goal setting in sport and exercise psychology should continue to utilize both quantitative and qualitative research methodologies in order to fully interpret and explain the results.

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APPENDIX A

3-MINUTE SIT-UP PROFILE

UNIVERSITY OF ALBERTA

3-MINUTE SIT-UP PROFILE

NAME: _____

AGE: _____

BASELINE SCORE: _____ RANK: _____ BLOCK: _____

EXPERIMENTAL GROUP: _____

PRE-TEST SCORE: _____

TREATMENT: _____

POSTTEST SCORE: _____

POST HOC QUESTIONNAIRE: _____

APPENDIX B

WRITTEN EXERCISE AGREEMENT

UNIVERSITY OF ALBERTA

WRITTEN EXERCISE AGREEMENT

I understand the exercise task and agree to try my best to do _____consecutive sit-ups and then carry on as long as possible or until the 3 minutes has elapsed.

SUBJECT:

NAME: _____ SIGNATURE: _____ DATE: _____
(Please Print)

INVESTIGATOR:

NAME: _____ SIGNATURE: _____ DATE: _____
(Please Print)

WITNESS:

NAME: _____ SIGNATURE: _____ DATE: _____
(Please Print)

APPENDIX C

RAW DATA

RAW DATA

TREATMENT	BLOCK	SUBJECT	BASELINE	PRE-TEST	GOAL	POSTTEST	QUESTIONNAIRE RESPONSES									
							# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10
A	B1	1	129	131	157	125	1	1	2	1	2	3	3	4	3	1
A	B1	2	106	124	149	126	3	1	1	4	3	3	3	4	3	2
A	B1	3+	101	105	126	115	1	1	1	4	2	3	1	4	2	2
A	B2	4	95	100	120	79	1	2	1	4	3	3	3	3	2	2
A	B2	5	93	94	113	105	2	1	1	1	2	2	3	3	1	2
A	B2	6	88	104	125	108	3	1	1	4	2	2	2	2	2	2
A	B3	7	85	97	116	90	1	1	1	1	3	2	3	4	3	1
A	B3	8	79	87	104	88	1	2	1	1	1	3	3	4	3	1
A	B3	9	75	86	103	103	1	1	1	4	1	3	1	1	1	1
A	B4	10	69	59	71	81	1	1	1	1	2	2	4	3	2	2
A	B4	11	67	79	95	91	1	1	1	1	3	3	3	4	3	2
A	B4	12	65	65*	78	87*	2	1	1	2	2	3	3	3	2	1
A	B5	13	60	62	74	53	1	1	3	3	3	3	3	4	3	2
A	B5	14	50	55	66	31	1	1	1	1	4	3	4	4	4	1
A	B5	15	40	42	50	58	2	1	1	3	1	1	3	2	1	2

* = tested individually
\+ = subjects data contaminated

RAW DATA

TREATMENT	BLOCK	SUBJECT	BASELINE	PRE-TEST	GOAL	POSTTEST	QUESTIONNAIRE RESPONSES									
							# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10
B	B1	1	128	137	140	140	2	1	1	3	2	3	3	2	2	1
B	B1	2	106	100	100	106	1	1	1	3	1	3	4	4	4	2
B	B1	3	99	98	100	72	2	3	4	4	1	2	2	1	1	2
B	B2	4	96	118	120	126*	4	1	1	4	2	2	1	2	2	2
B	B2	5	93	90	85	90	1	1	1	1	2	3	3	3	2	2
B	B2	6	91	100*	102	105	1	1	1	2	2	3	2	4	2	1
B	B3	7	81	85	86	94	3	1	1	3	2	2	2	1	2	1
B	B3	8	80	111	125	105	2	1	1	4	2	3	2	4	2	2
B	B3	9	78	80	75	92	1	1	1	3	2	3	2	3	4	2
B	B4	10	71	69*	35	62	1	1	1	4	2	3	3	4	3	2
B	B4	11	67	79	80	87	1	1	1	3	2	3	3	4	2	1
B	B4	12	66	68*	75	76*	3	4	1	3	3	3	2	4	1	1
B	B5	13	61	66	77	61	1	1	1	1	2	3	2	4	4	2
B	B5	14	54	66*	70	59*	1	1	2	3	3	3	2	3	2	1
B	B5	15	44	35	40	39*	1	1	1	1	2	2	3	3	3	2

* = tested individually

RAW DATA

TREATMENT	BLOCK	SUBJECT	BASELINE	PRE-TEST	GOAL	POSTTEST	QUESTIONNAIRE RESPONSES									
							# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10
C	B1	1	116	109	000	114	2	1	1	1	2	3	3	2	4	2
C	B1	2	114	129	000	131	2	1	1	4	1	3	1	4	3	1
C	B1	3	97	95	000	97	1	1	1	4	2	3	1	4	1	1
C	B2	4	94	109	000	100*	1	1	1	3	2	3	2	4	1	1
C	B2	5	93	103	000	115	1	1	1	1	2	3	3	4	4	1
C	B2	6	87	105	000	91	1	4	4	4	3	3	2	2	3	2
C	B3	7	83	77*	000	89*	1	1	1	3	2	3	3	3	2	2
C	B3	8	79	80	000	95	1	1	1	3	3	3	3	3	2	3
C	B3	9	75	74	000	70	1	1	1	1	2	3	3	3	3	2
C	B4	10	73	78	000	86	1	1	1	1	2	3	4	3	3	2
C	B4	11	68	94*	000	104	3	3	1	3	2	2	3	3	2	2
C	B4	12	63	71	000	72*	1	1	1	1	3	3	4	3	3	2
C	B5	13	61	56*	000	59*	1	1	1	4	2	3	2	2	2	2
C	B5	14	53	50	000	40	1	1	1	4	2	2	3	2	2	1
C	B5	15	49	67*	000	65	1	3	1	3	2	3	2	3	2	2

* = tested individually

APPENDIX D

POST-HOC QUESTIONNAIRE

UNIVERSITY OF ALBERTA

Name _____
(Please Print)

QUESTIONNAIRE

Please answer all questions

1. Explain briefly why you volunteered for the study.

Place an 'X' beside the most appropriate answer

2. Did you at any time during the study engage in any form of competition with subjects in your group e.g., try to get close to, equal or beat another subjects sit-up score?

_____ No, not at all
_____ Yes, only on the pre-test
_____ Yes, only on the posttest
_____ Yes, on both the pre-test and posttest

3. Did you at any time during the study engage in any form of competition with subjects in other groups e.g., try to get close to, equal or beat another subjects sit-up score?

_____ No, not at all
_____ Yes, only on the pre-test
_____ Yes, only on the posttest
_____ Yes, on both the pre-test and posttest

4. In addition to what the researcher asked of you, did you at any time during the study set your own personal goal eg., say to yourself that you wanted to do a certain number of sit-ups?

_____ No, not at all
_____ Yes, only on the pre-test . If yes, how many sit-ups? _____
_____ Yes, only on the posttest . If yes, how many sit-ups? _____
_____ Yes, on both the pre-test and posttest . . . . . If yes, indicate below the number of sit-ups for both the Pre-test and Posttest in the appropriate answer space.

Pre-test _____
Posttest _____

5. Towards the end of the 3 minutes did you find the sit-up task:

_____ enjoyable.
_____ uncomfortable.
_____ painful.
_____ very painful.

6. Throughout the study did you find that the researcher

_____ motivated you to work very hard
_____ motivated you to work fairly hard
_____ had no effect on your motivation
_____ had a negative effect on your motivation

7. How important was it for you to do well on the 3 minute sit-up task?

_____ very important
_____ quite important
_____ only a little important
_____ not important at all

8. How important was it for you to please the researcher?

_____ very important
_____ quite important
_____ only a little important
_____ not important at all

9. Immediately before the posttest on the 3 minute sit-up task how motivated were you to do well?

_____ very motivated
_____ quite motivated
_____ only a little motivated
_____ not motivated at all

10. Overall how hard do you feel you worked on the 3 minute sit-up task?

_____ I worked very hard
_____ I worked fairly hard
_____ I did not work that hard
_____ I did not work hard at all

11. Did you notice any change in the instructions from those given immediately before the Pre-test, compared to those given, immediately before the Posttest?

If No, please tick _____

If Yes, please specify _____

_____

_____

_____

APPENDIX E

QUESTIONNAIRE RESPONSE FREQUENCY TABLES

QUESTIONNAIRE RESPONSE FREQUENCY TABLES

ITEM # 1: "Explain briefly why you volunteered for the study".
(Answers were coded into four categories as specified)

RESPONSE	TREATMENT			
	A	B	C	TOTAL
1. To help out	9	9	12	30
2. Interest in testing and research	3	3	2	8
3. Interest in personal fitness	2	2	1	5
4. Competing against others	0	1	0	1

ITEM # 2: "Did you at any time during the study engage in any form of competition with subjects in your group e.g. try to get close to equal or beat another subjects sit-up score"?

RESPONSE	TREATMENT			
	A	B	C	TOTAL
1. No, not at all	12	13	12	37
2. Yes, only on the pre-test	2	0	0	2
3. Yes, only on the posttest	0	1	2	3
4. Yes, on both the pre-test and posttest	0	1	1	2

ITEM # 3: "Did you at any time during the study engage in any form of competition with subjects in other groups e.g. try to get close to, equal or beat another subjects sit-up score"?

RESPONSE	TREATMENT			
	A	B	C	TOTAL
1. No, not at all	12	13	14	39
2. Yes, only on the pre-test	1	1	0	2
3. Yes, only on the posttest	1	0	0	1
4. Yes, on both the pre-test and posttest	0	1	1	2

ITEM # 4: "In addition to what the researcher asked of you, did you at any time during the study set your own personal goal e.g. say to yourself that you wanted to do a certain number of sit-ups"

RESPONSE	TREATMENT			
	A	B	C	TOTAL
1. No, not at all	7	3	5	15
2. Yes, only on the pre-test	1	1	0	2
3. Yes, only on the posttest	2	7	5	14
4. Yes, on both the pre-test and posttest	4	4	5	13

ITEM # 5: "Towards the end of the 3 minutes did you find the sit-up task":

RESPONSE	TREATMENT			
	A	B	C	TOTAL
1. enjoyable	3	2	1	6
2. uncomfortable	5	11	11	27
3. painful	5	2	3	10
4. very painful	1	0	0	1

ITEM # 6: "Throughout the study did you find the researcher":

RESPONSE	TREATMENT			
	A	B	C	TOTAL
1. motivated you to work very hard	1	0	0	1
2. motivated you to work fairly hard	4	4	3	11
3. had no effect on your motivation	9	11	12	32
4. had a negative effect on your motivation	0	0	0	0

ITEM # 7: "How important was it for you to do well on the 3 minute sit-up task"?

RESPONSE	TREATMENT			
	A	B	C	TOTAL
1. Very important	1	1	2	4
2. Quite important	1	8	4	13
3. Only a little important	10	5	7	22
4. Not important at all	2	1	2	5

ITEM # 8: "How important was it for you to please the researcher"?

RESPONSE	TREATMENT			
	A	B	C	TOTAL
1. Very important	1	2	0	3
2. Quite important	2	2	4	8
3. Only a little important	4	4	7	15
4. Not important at all	7	7	4	18

ITEM # 9: "Immediately before the posttest on the 3 minute sit-up task how motivated were you to do well"?

RESPONSE	TREATMENT			
	A	B	C	TOTAL
1. Very motivated	3	2	2	7
2. Quite motivated	4	8	6	18
3. Only a little motivated	6	2	5	13
4. Not motivated at all	1	3	2	6

ITEM #10: "Overall how hard do you feel you worked on the 3 minute sit-up task"?

RESPONSE	TREATMENT			
	A	B	C	TOTAL
1. I worked very hard	6	6	5	17
2. I worked fairly hard	8	9	9	26
3. I did not work that hard	0	0	1	1
4. I did not work hard at all	0	0	0	0

ITEM #11: (TREATMENT GROUP C ONLY) "Did you notice any change in the instructions from those given immediately before the pre-test, compared to those given, immediately before the posttest"

Number of subjects who noticed change in instructions.	1
Number of subjects who did not notice change in instructions.	14

APPENDIX F

SUBJECT CONSENT FORM

UNIVERSITY OF ALBERTA

CONSENT:

I, _____ , agree to participate in a research
(Please print)
project by R. Alderman and A. Pepper involving testing on a 3 minute sit-up task conducted on three separate days. I agree to participate in the exercise testing to the best of my ability and I understand that I may withdraw from the study at any time, or discontinue any test procedure if I experience unusual discomfort. I also understand that the staff conducting the tests will discontinue the procedure if any indications of abnormal responses become apparent. I understand that prior to performing any of the tasks required, the research staff will have explained thoroughly the exact procedures to be followed and that I will have the opportunity to ask any questions that I may have. I acknowledge that I have read this form and that I understand the test procedures and the inherent risks and benefits from participation in this study.

SUBJECT:

NAME: _____ SIGNATURE: _____
(Please print)

ADDRESS: _____ DATE: _____

_____ TEL: _____

_____

WITNESS:

NAME: _____ SIGNATURE: _____
(Please print)

INVESTIGATOR:

NAME: _____ SIGNATURE: _____
(Please print)